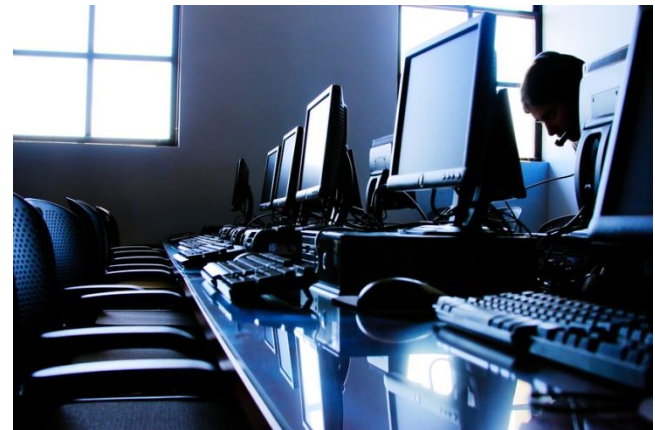


Maximizing Your IT Budget through Energy Efficiency



Agenda

- Focus on Energy overview
- IT and data center energy growth
- Demand and supply energy
- Energy-efficient computing
- Recent IT projects



Benefits of Energy Efficiency

- Save money
- Protect the environment
- Increase reliability of energy resources by controlling the state's growing demand
- Promote in-state economic development

What is Focus on Energy?



Wisconsin utilities'
statewide program
for energy
efficiency and
renewable energy

What is Focus on Energy?

- A partnership of all of Wisconsin's investor- and municipally-owned utilities, as well as about half of electric cooperatives
- One statewide energy efficiency and renewable energy program rather than many, separate programs

What Does Focus on Energy Do?

- Helps Wisconsin residents and businesses implement energy-saving projects
- Offers unbiased information and technical assistance participating utilities' electric and/or natural gas customers
- Provides cash incentives for energy-saving projects that would not occur otherwise

Accomplishments

Focus on Energy has saved
Wisconsin residents and businesses
\$2.20 for every dollar spent

Overall, Wisconsin residents and
businesses save over **\$319 million**
annually in energy costs

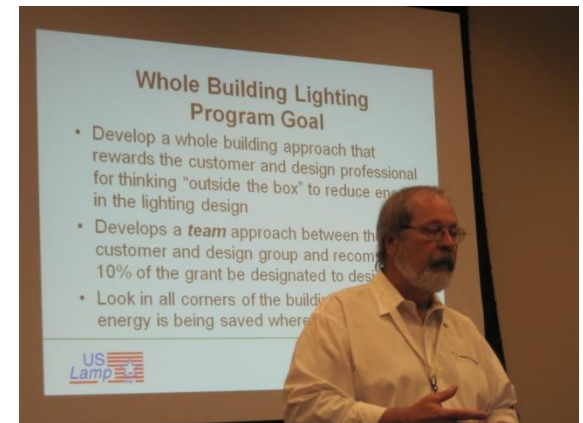
Accomplishments

More than 91,000 businesses and 1.7 million residents have participated

More than 3,000 trade allies partner with Focus on Energy

Focus on Energy Services

- Energy-efficiency & renewable energy services
 - Technical expertise
 - Education and training
 - Financial assistance
- Services available to businesses and homeowners
 - Single/multifamily homes
 - Commercial, industrial, agribusiness, schools and government facilities



Targeted Markets Program Incentives

- **Standard *prescriptive* incentives** on lighting, motors, HVAC equipment, compressed air, etc.; can be submitted by customer
- **Incentives for *custom* projects** calculated by estimated energy savings; up to 30% of project's cost with a max of \$250,000
 - Must work with an Energy Advisor on custom projects

**FOCUS ON ENERGY
SCHOOLS & GOVERNMENT SECTOR
ENERGY ADVISOR AREAS
K-12 SCHOOLS AND LOCAL GOVERNMENT
BUILDINGS**

Bobbi Rongstad
715.893.2305
brongstad@gmail.com

Luke Schultz
715.720.2167
lschultz@cese10.k12.wi.us

Don Keck
715.720.2153
888.947.4701
dkeck@cese10.k12.wi.us

Lee Schwab
715.235.0024
lschwab@cese10.k12.wi.us

John Heck
715.720.2121
jheck@cese10.k12.wi.us

Jeff McCarthy
715.720.2120
888.947.6016
jmccarthy@cese10.k12.wi.us

Chuck Zinda
715.720.2152
888.947.4699
czinda@cese10.k12.wi.us

Heather Feigum
715.720.2122
888.947.2381
hfeigum@cese10.k12.wi.us

Jennifer Everhart
715.720.2136
888.947.6048
jeverhart@cese10.k12.wi.us

Steve Cramer
Team Leader
715.720.2168
scramer@cese10.k12.wi.us

focus on energy
Partnering with Wisconsin utilities

**For general school and government Focus on Energy assistance
please contact our Customer Development Program at 888.947.4703**



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**focus on energysm**

Partnering with Wisconsin utilities

Current IT Incentives

- Prescriptive IT incentives
 - Network power management
 - Server virtualization
 - Thin client conversion
- Custom IT incentives
 - Multi-user computing
 - Energy-efficient UPS
 - Energy efficient cooling, airflow management



Data Centers = Information Factories

- Data centers are energy-intensive facilities
 - Surging demand for data storage
 - Server racks now designed for >25+ kW
 - Typical facility ~1MW (can be >20 MW)
 - Nationally 1.5% of US electricity consumption in 2006
- Significant data center building boom
 - Power, cooling constraints in existing facilities
- Growing faster than any other electric load



Energy Issues Abound

“Over the next five years, power failures and limits on power availability will halt data center operations at more than 90% of all companies.”

AFCOM Data Center Institute's Five Bold Predictions, 2006

“By 2008, 50% of current data centers will have insufficient power and cooling capacity to meet the demands of high density equipment.”

Gartner press release, 2006

“Survey of 100 data center operators: 40% reported running out of power, cooling capacity, and to a lesser extent, space without sufficient notice.”

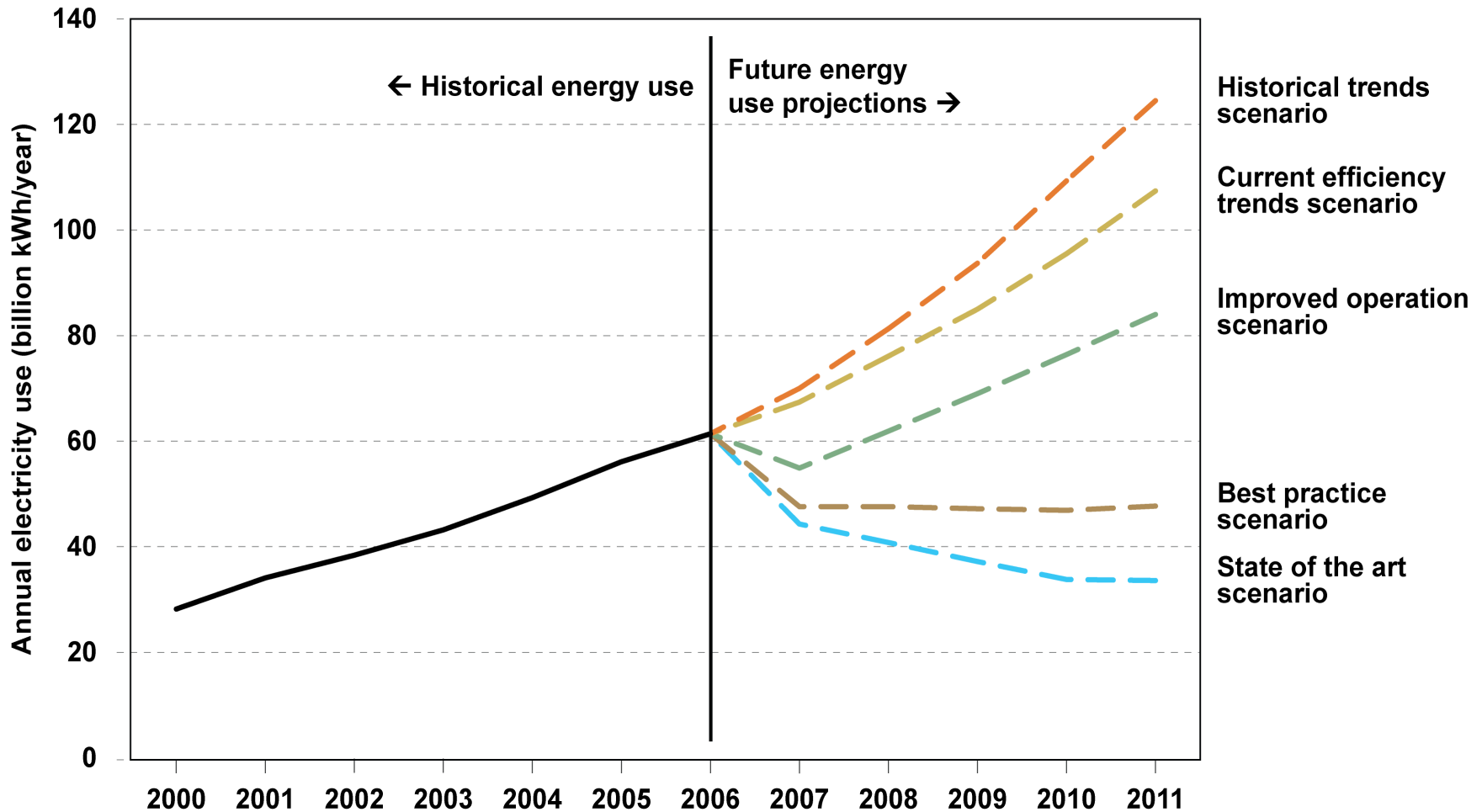
Aperture Research Institute

Rising Cost of IT Systems

- 2000 - 2006: average computer power density increased from 23 W/sf to 35 W/sf
- Electricity cost and supporting infrastructure is surpassing the capital cost of IT equipment over its useful life
- Split incentives: IT and facility costs are managed by different parts of an organization



EPA Projected Energy Use



Source: EPA Report to Congress, U.S. DOE,
Office of Energy Efficiency & Renewable Energy

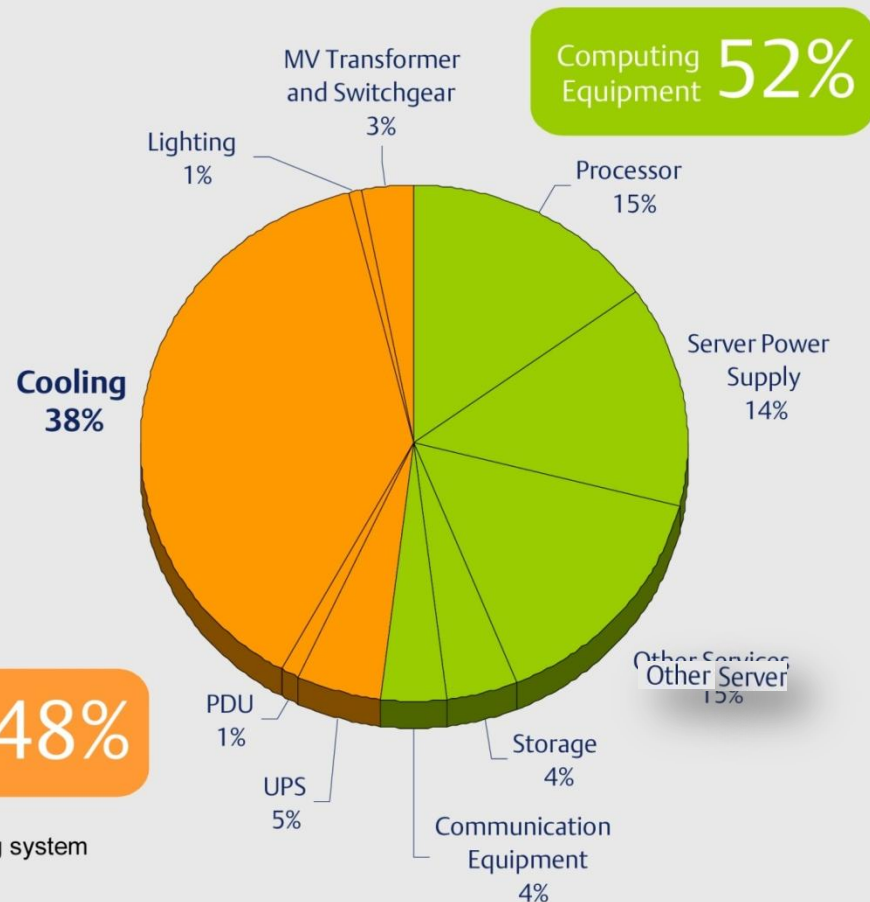
Supply and Demand Energy

| Equipment Category | Energy Consumption |
|---|--------------------|
| Computing | 588 kW |
| Lighting | 10 kW |
| UPS & Distribution Losses | 72 kW |
| Cooling Power Draw for Computing & UPS Losses | *429 kW |
| Building Switchgear / MV Transformer / Other Losses | 28 kW |
| Total Power Draw | 1,127 kW |

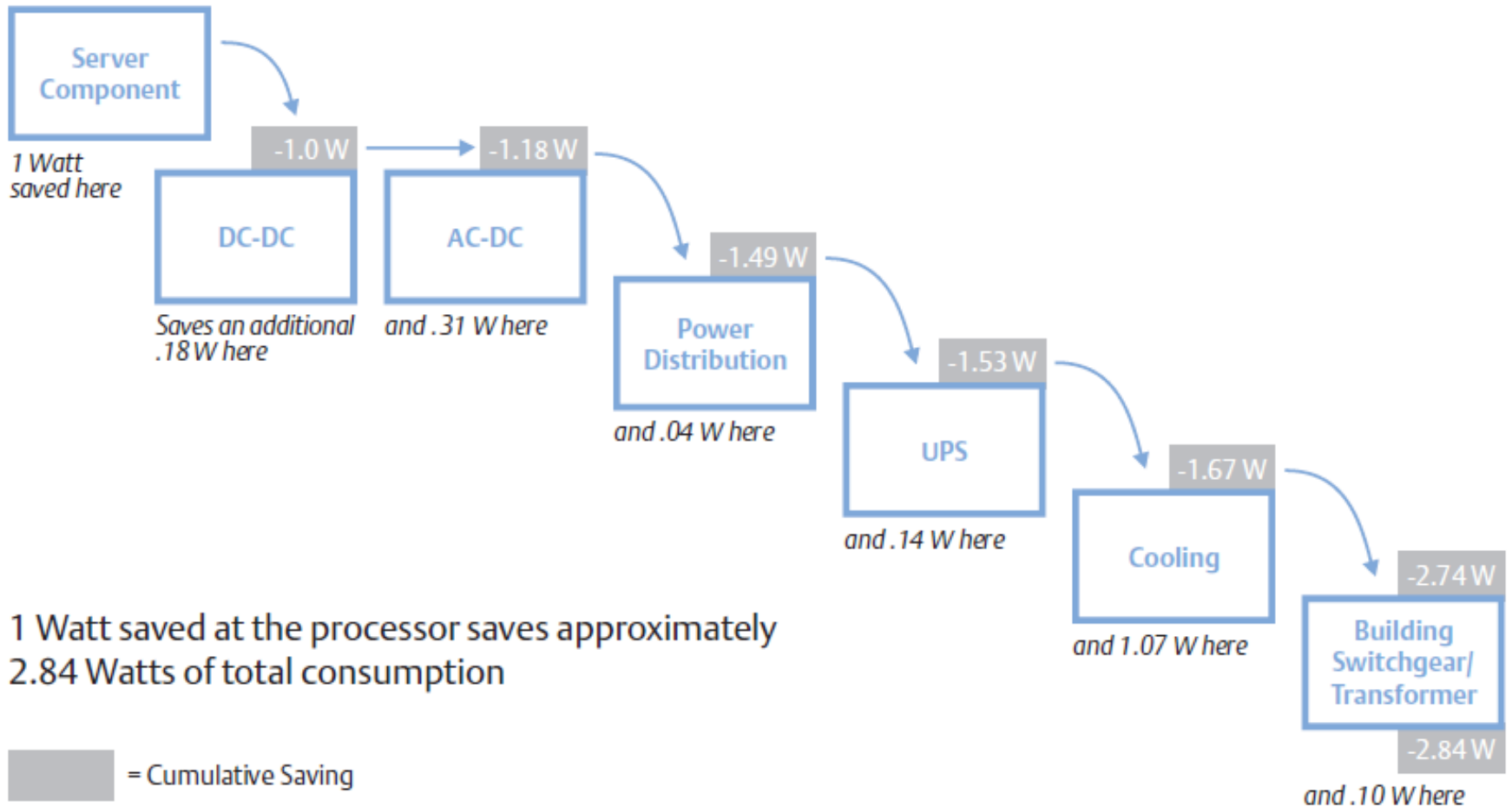
Power and Cooling 48%

* Cooling load assumes chilled water based cooling system

© 2007 Emerson Network Power



IT Energy Supply Side



2010 IT Projects – S & G

- 69 projects completed by 36 districts and agencies
- Savings achieved:
 - Peak demand reduction – 198 kW
 - Energy reduction – 2,589,597 kWh
 - Annual cost savings – \$207,000
- Incentives awarded: \$135,754

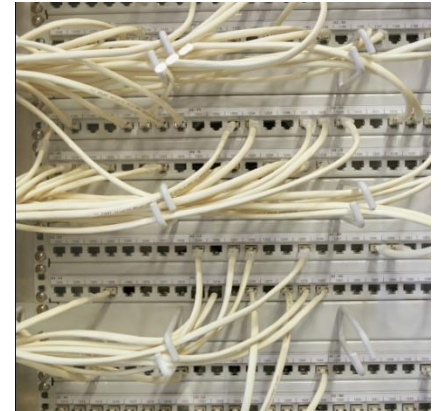


Case Study: UW-Oshkosh PC Network Energy Management

- PC's kept on 24/7 to accommodate students and complete nightly software updates
- To save energy, the campus used built-in Windows Wake on LAN functions along with EPA's free power management tool, EZ GPO
 - 485 computers put into low-power sleep mode
 - Continued to perform software updates at night
 - Saved approximately **\$20 per PC annually**

Case Study: Eau Claire County Server Virtualization

- Removed underutilized servers
(20 servers replaced by 2 servers)
- Total energy savings:
 - 6.12 kW
 - 53,634 kWh
 - Includes energy saved by reducing number of servers, server cooling, UPS losses, UPS cooling
- Annual cost savings = \$4,290



2010 IT Incentives

- Offered \$243,000 for virtualization projects
- Server Virtualization ($\$280 + \$150 = \$430$)
 - Anticipated savings 3,500 kWh per server
 - At \$0.08/kWh, annual savings of \$280
- Thin Client Conversion ($\$32 + \$60 = \$92$)
 - Anticipated savings of 400 kWh per PC replaced
 - At \$0.08 /kWh, annual savings of \$32 per PC

IT Energy-Saving Opportunities

IT

- Power supply efficiency
- Standby/sleep power modes
- IT equipment fans
- Virtualization
- Thin client conversion
- Multiuser computing
- Load shifting
- Storage
- ENERGY STAR

Electrical

- UPS, transformer efficiency
- High voltage distribution
- Premium efficiency motors
- DC power use
- Standby generation
- Right sizing/redundancy
- Lighting – efficiency and controls
- On-site generation

Cooling

- Air management
- Free cooling – air or water
- Environmental conditions
- Centralized air handlers
- Low pressure drop systems
- Fan efficiency
- Cooling plant optimization
- Direct liquid cooling
- Right sizing/redundancy
- Heat recovery
- Building envelope

Financial Analysis

- Annual savings in dollars
- Simple payback calculation:
 - $\text{net investment} / \text{annual savings} = \text{payback period}$
- Lifecycle costs



Selling a Facility Project

- Example: Lighting
 - Old technology vs. New Technology
 - Cost for repair or replace
 - Old Energy vs. New Energy
 - Difference in operating costs
 - Old Maintenance Cost vs. New Maintenance Cost
 - Life of equipment



Selling IT Projects

- Benefits of energy-efficient IT upgrades:
 - Technology Improvement
 - Repair or replace
 - Energy Savings
 - Lowers operating costs
 - Process Efficiency
 - Improves work being completed
 - Life of Equipment

Contacting Focus on Energy

Phone: 800.762.7077

Email: focusinfo@focusonenergy.com

Web: focusonenergy.com

Address: 8383 Greenway Blvd • Suite 600
Middleton WI 53597